

Critical Indices of the Order Parameter and Diameter of Cesium and Rubidium Liquid - Vapor Coexistence Curves

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Recently for approximation of the data of coexisting phase densities near the critical point experimenters widely used the extended scale equation with fixed theoretical values of the critical indexes [1]. These indexes were obtained by the renormalization group calculation method of the three-dimensional Ising model, which give for the coexistence curve the value $\beta_0 = 0.325$. At the same time applying the method of approximation, in which the values of critical indexes and amplitudes are considered as free parameters, the authors [2-5] obtained for Ne, HD, N₂, C₂H₄, C₆H₆, SF₆ the value $\beta_0 = 0.35 \pm 0.01$. This value does not correspond to the three-dimensional Ising model and to conclusions of works [1,6].

Statistical data analysis on the densities of metal liquids Cs and Rb [7] is conducted in this work. The critical parameters T_c , ρ_c , of Cs and Rb were defined more exactly using the technique of experimental data processing, which was proposed in [2,3]. A more correct description of experimental data is obtained than was made in [7]. The obtained results convince us that the behavior of the metal liquids Cs and Rb near the critical point is similar to the molecular liquids' behavior, and the reference of the metal liquids to the three-dimensional Ising model universality class is also doubtful.

- [1] R.R. Singh and K.S. Pitzer, *J. Chem. Phys.* **90**, 5742 (1989).
- [2] Yu.I. Shimansky and E.T. Shimanskaya, *Int. J. Thermophys.* **17**, 651 (1996).
- [3] E.T. Shimanskaya *et al.*, *Int. J. Thermophys.* **17**, 641 (1996).
- [4] E.T. Shimanskaya and Yu.I. Shimansky, *High Temp.-High Press.* **29**, 509 (1997).
- [5] Yu.I. Shimansky, and E.T. Shimanskaya, *High Temp.-High Press.* **30**, 635 (1998).
- [6] J.V. Sengers and J.M.H. Levelt Sengers, *Ann. Rev. Phys. Chem.* **37**, 189 (1986).
- [7] S. Jungst, B. Knuth, and F. Hensel, *Phys. Rev. Lett.* **55**, 2160 (1985).